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ABSTRACT

This study, part of the Kamehameha Early Education Program (KEEP), investigated the accuracy of children's self reports under various contingencies. Sixteen first grade arithmetic students were randomly assigned to two groups, A and B. It was found that both groups learned to check their own work and report it fairly accurately when no contingencies were present. As soon as a contingency was instituted for correct work, both groups began to inflate their scores significantly so as to obtain the reward. In the final phase, Group A was given an occasional additional reward for correct reporting of their performance, while Group B continued as before. Group A again began to report their performance fairly accurately, while Group B continued to inflate their reports. It is argued that accurate self-reports and self-rewards are dependent upon external stimuli. Previous studies showing reinforcement effects of self-reward are analyzed in terms of the present findings. Implications of the use of self-administered rewards for classroom management are discussed. (Author/RH)

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Abstract

This study investigated the accuracy of children's self reports under various contingencies. Sixteen first grade Arithmetic students were randomly assigned to two groups, A and B. It was found that both groups learned to check their own work and report it fairly accurately when no contingencies were present. As soon as a contingency was instituted for correct work, both groups began to inflate their scores significantly so as to obtain the reward. In the final phase, Group A was given an occasional additional reward for correct reporting of their performance, while Group B continued as before. Group A began to, once again, report their performance fairly accurately, while Group B continued to inflate their reports. It is argued that accurate self-reports and self-rewards are dependent upon external stimuli. Previous studies showing reinforcement effects of self-reward are analyzed in terms of the present findings. Implications of the use of self-administered rewards for classroom management is discussed.

Technical Report #46

The Effect of Various Reinforcement Contingencies on the Accuracy of Children's Self-Reports

Gisela E. Speidel*

A number of recent studies, conducted mostly with children in the classroom, have reported on the effective use of token reinforcement mediated through self-evaluations. For example, Bolstad and Johnson (1972) and Drabman, Spitalnik and O'Leary (1973) found that disruptive behavior was reduced if children were asked to administer checks or tokens to themselves for nondisruptive behaivors. Similarly, Glynn, Thomas and Shee (1973) increased on-task behavior in second graders by having them self-administer check marks if they were on-task, whenever a beep was sounded. Furthermore, there are studies suggesting that children's academic work can be strengthened by self-imposed contingencies (Lovitt and Curtiss, 1969; Johnson, 1970; and Glynn, 1970).

The advantage of such self-management procedures in a classroom is obvious. If children can impose their own performance criteria, monitor their own behavior, and take contingent self-rewards, the teacher no longer needs to spend her time disciplining and checking the children but instead she can concentrate on giving academic instruction. Moreover, in learning to become their own contingency managers, children are acquiring a potentially valuable self-control skill.

*Sarah Sueoka's and Karen Bogert's assistance in this study is gratefully acknowledged.

However, a key issue for these procedures is the assumption that an individual will report his own behavior accurately and will take only deserved (contingent) rewards, despite the absence of any controlling external stimuli (Speidel, 1975). Many of the studies purporting to show self-reinforcement effects have had environmental stimuli present that may have maintained accurate self-reporting or self-rewarding and thus made the situation more like an experimenter-mediated reinforcement situation. For instance, in the Bolstad and Johnson (1972) experiment, the children's self-checks were initially compared with those of observers. During the subsequent phase of independent self-administration of checks, the observers were still present. It is possible, therefore, that the children continued to award themselves only deserved check marks because they thought the observers were still checking them and they might get caught giving themselves too many points.

The hypothesis that someone may need to check the children's self-administered points to maintain contingent rewarding is supported by Santogrossi, O'Leary, Romanczyck, and Kaufman's (1973) study. They found that an initial decrease in disruptive behavior during self-reinforcement was followed by an increase in disruptive behavior once the children discovered that they could give themselves more points than they deserved and still trade them in for the reward. A short period of reinforcement for matching the teacher's rating did not result in more accurate self-recordings. Drabman et al. (1973) were able to maintain relatively accurate self-reports by giving bonus points for self-ratings that matched the teacher's ratings. These bonus points and accompanying teacher checks were then slowly faded, but the self-ratings remained fairly accurate. However, the authors state that peer pressure was exerted when the children inflated their ratings, thus again environmental stimuli were probably maintaining contingent rewarding.

The present study was designed to investigate in further detail the

accuracy of children's self-reports under various conditions of reinforcement. Specifically, the study addressed itself to the following questions: a) Can first grade children correct their own work and record their performance accurately without the presence of a teacher? b) When a reinforcer is introduced for the performance being recorded will the self-recordings become inaccurate to obtain the reinforcer? This phase resembles the self-evaluation and self-administration of points or checks of the studies described above. c) If accuracy of self-recording decreases in (b), can it be reestablished by introducing an additional reinforcer for accurate self-recording?

Method

Subjects

Sixteen first grade Math students, 75% of whom came from low-income homes, participated in the study. The children were paired on the basis of their tested level of Math at the beginning of the experiment, and then randomly assigned to two groups, A and B.

Materials

The Addison Wesley Math series with accompanying worksheets was used. Each child had a folder which contained his daily worksheets. Attached to the folder was a day-by-day record of the number of problems a child had done correctly and the number of problems he had completed. The teacher placed only as many worksheets into a child's folder as she thought the child would be able to complete in one session.

There were two sources of potential reinforcement unrelated to the experimental procedures: a) praises by the teacher for good behavior; and b) games contingent upon completion of work.

The rewards used for the experimental manipulations were coloring sheets

and sheets of dot-to-dot. Previous experience with this group of children had shown that they enjoyed such sheets very much.

Setting

The experiment was conducted during the daily 45-minute Math period. The children, working independently, were seated around small tables in groups of four or five. There were a total of 24 children in the class. Eight children are not included in the present report as they were to function as a control group for subsequent experimentation and they received no self-check training. The regular school teacher conducted the class, assisted by a research assistant.

Procedure

The experiment consisted of four phases. During the first phase, both groups of children were trained to correct their own work, to count the number of problems they had done correctly, and to record this figure on their graph. In the second phase, the teacher no longer verified the accuracy of the children's checking and self-reports, and the results of this phase were used as the baseline measure of accurate self-reports. In the third phase, a reward was made contingent upon self-reports of perfect work, and, in the final phase, an additional reward was given to children in Group A for accurate checking and reporting of their work. Group B continued as during Phase 3.

Phase 1: Training self-checking. The two groups were given the following instructions by the teacher: "From now on I would like you to check your own work and write the number of problems you did correctly on to your graph just the way I used to do. Every day you will find in your folder the work you did the day before, and also another worksheet exactly like yours with the answers written on it with a red pen. This sheet is called the answer sheet. Every day as soon as you get your folder, open it up and look for your work

and the answer sheet and begin to check your work." The teacher then proceeded to model the checking of one of the children's papers, and, subsequently, the counting and recording of the numbers of problems completed correctly. She instructed the children further, "When you have completed checking and recording your work, raise your flag and I will come and see whether you checked your work correctly." As soon as the children had completed checking, they began to work on the Arithmetic assignment for that day.

This procedure was continued for seven sessions, followed by three days in which the teacher no longer gave any assistance to the children. During these three trial days, only 10% of the records contained errors, and it was decided that the children needed no further training in checking their work.

Having the students check their work the following day enabled the teacher to record how many problems the children had actually completed correctly before they had the opportunity of changing their answers. She made no marks on their papers and the children were unaware that she was checking their work until the occasional checks were announced in Phase 4 to Group A.

Phase 2: Baseline. This phase was similar to Phase 1 except that the teacher no longer gave any work-checking assistance to the children. Any inaccuracies in the records were ignored. This phase lasted for a total of six sessions.

Phase 3: Reinforcement for the monitored behavior. A contingency was introduced in both groups for recording 100% correct work. The teacher gave the following instructions: "Beginning with today's work you will be rewarded for getting perfect work. If you get your work all correct without any mistakes, you will get to put a star on your graph and I will give you a dot-to-dot or a coloring sheet, whichever you like." This phase continued for 10 sessions, and the teacher rewarded each child who recorded 100% correct work,

regardless of the child's actual performance.

Phase 4: Bonus rewards for accurate reporting of the monitored behavior. During this phase, Group A received bonus rewards for correctly reporting the number of answers they had completed without error. The instructions given to this group were as follows: "Your work will occasionally be checked by Mrs. ___ and myself. If you recorded what you did accurately, you will get to take home a sheet or coloring or dot-to-dot, even if you didn't get all the problems right. If you get all the problems right and you recorded it correctly, you will get to take a second coloring or dot-to-dot sheet: one for getting all the problems right, the other for recording correctly." If the children recorded perfect work when indeed they had not performed perfect work, nothing was said and they were given the usual reward sheet for reporting that they had done perfect work. This procedure continued for a period of 10 sessions and checks occurred on the second, third, fifth, eighth and tenth sessions.

Results

An index of each child's inaccurate self-recordings was obtained for each of Phases 2, 3, and 4 in the following manner: For every child a percentage score was derived by dividing the number of times he recorded his performance inaccurately by the number of occasions inaccurate self-records could occur, and multiplying this ratio by 100%.

$$\frac{\text{Number inaccurate self-recordings}}{\text{Number possible inaccurate self-recordings}} \quad (\times 100\%)$$

Since the dependent variable was to reflect the extent to which self-reports were influenced by the introduction of a reward for perfect work, an inaccurate self-recording was only scored whenever a child gave himself a

higher score on a particular day than he had actually obtained. The degree to which he distorted (i.e. whether he gave himself one or ten more correct answers) was not recorded, only whether he did or did not distort his score in a favorable direction. Errors in reporting that decreased the number of problems completed correctly were not counted. Furthermore, days on which the child obtained perfect work were disregarded, even if he made an error.

Figure 1 shows the mean percentage of inflated self-records for each group during Phases 2, 3, and 4. During Phase 2, baseline, the average percentages of inaccurate self-records were 10.75% and 19.75% for Groups A and B respectively. With the introduction of the reinforcer for correct work,

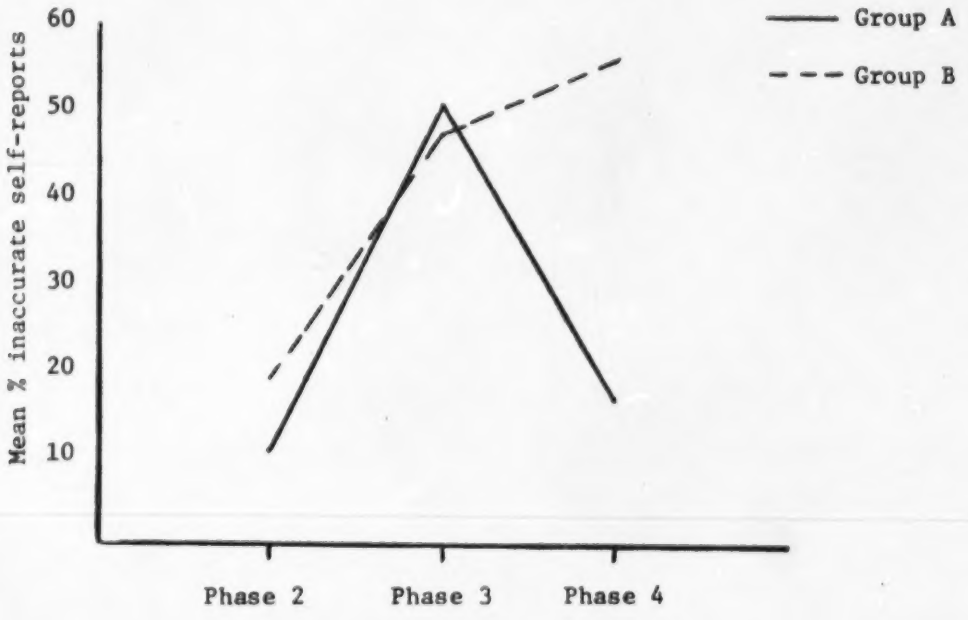

Figure 1

The mean percentage of inaccurate self-reports during Phase 2 (baseline), Phase 3 (introduction of reinforcer for the monitored behavior), and Phase 4 (additional reinforcer for accurate reporting by Subjects of Group A, but not Group B).

the frequency of inaccurate self-reports increased to 50.75% for Group A and 47.75% for Group B. The introduction of the bonus for correct recording during Phase 4 decreased the mean frequency with which Group A inflated their scores to 17.13%, while Group B who did not receive the bonus increased their inaccurate self-reports to 56%.

The results were analyzed by means of a two-factor repeated measures analysis of variance with one between Subject variable (Groups) and one within Subject variable (Phases). Table 1 summarizes the results of the analysis of variance. The main effect for groups was not significant ($F(1,14=1.95)$, indicating that there were no overall differences between the two groups. However, the effect across Phases was significant ($F(2,28)=6.46$, $p < .005$). The interaction effect between Phases and Groups just missed significance ($F(2,28)=2.52$, $p > .10$).

Two post hoc comparisons were of interest, namely (a) the frequency of inaccurate self-records between Phase 2 and 3 for both groups combined, to assess the effect of the introduction of the reinforcer for reporting perfect work; and (b) the frequency of inaccurate self-reports between Groups A and B. during Phase 4 to assess the effect of the introduction of the bonus for accurate self-recording. Using Dunn's method, both comparisons were found to be significant at the $p < .05$ level. Specifically, the frequency of inaccurate self-records increased from Phase 2 to Phase 3 for both groups combined; during Phase 4, the frequency of inaccurate self-reports was significantly lower for Group A who had received the bonus for accurate self-reports than for Group B, who had not received the bonus.

Table 1

Source	df	SS	MS	F
Total	47	5.54		
Between (Groups)	15	2.18		
A	1	.26	.26	
S/A	14	1.91	.13	1.95
Within (Phases)	32	3.36		
B	2	.94	.47	6.45*
AB	2	.36	.18	2.52
S/AB	28	2.04	.07	

*p .005

Discussion

The present study showed that first grade children can be taught to correct and record their academic work fairly accurately in the absence of any supervision. However, as soon as a contingency is introduced for the behavior being recorded, the children will begin to inflate their records to obtain the reward.

The findings of the various phases taken together indicate that accuracy of self-rating and of giving oneself points, depends upon environmental contingencies, and is a function of maximizing the available rewards. Both groups in this investigation began to inflate their scores when this produced pay-off. Group B in the final phase continued to report inflated scores more and more frequently, as they realized that, indeed, the pay-off was greatest when they reported perfect papers even when they had made errors. On the other hand, Group A decreased the frequency of reporting inflated scores when they obtained reinforcement 50% of the time for accurate reporting.

Therefore, whether a child will report his performance accurately and

take rewards contingently seems to depend upon the resultant reinforcement from a combination of environmental factors: a) the reinforcing value of the reward to be obtained contingent upon the self-report; and b) the cost for inflating the self-reward--loss of peer or teacher approval (in studies such as those mentioned below), training history (extensive training in honesty may mediate accurate self-ratings), and, in the present case, loss of additional reward for accurate self-reporting.

A number of studies that have supposedly manifested reinforcement effects derived from self-administered points or tokens were described in the introduction. It was suggested then that they contained environmental stimuli that possibly maintained adherance to the contingency rule. The present findings provide support for this hypothesis. Thus, in the Bolstad and Johnson (1972) study, the continued presence of the observers during the self-reinforcement phase probably mediated accurate self-administration of tokens, while in the study by Drabman et al. (1973) it was probably peer pressure. Although Turkewitz, O'Leary, and Ironsmith (1975) in their replication of the Drabman study do not mention it, similar peer pressure, or the teacher's continued matching of her ratings with the children's ratings may have motivated accurate self-administration of points.

By definition, adherance to the contingency rule is necessary for self-reinforcement to occur. If, however, it is indeed the case that contingent self-administration of rewards is mediated by external consequences, would it not be more parsimonious to describe self-reinforcement procedures in terms of a S-R chain, as proposed by Gewirtz (1971), rather than introducing a new construct called self-reinforcement?

What then are the implications for classroom management? Although no fading of the checking of the children's self-reports was conducted in the

present study, the above interpretation suggests that external stimuli will probably be necessary to maintain the appropriate behavior. The question of whether token reinforcement systems mediated indirectly or directly by the teacher are more effective over long periods of time must still be assessed. It is concluded that at this point it is too early to recommend the use of reinforcement mediated by self-evaluations to classroom teachers on a general basis.

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